

Project Design Phase

Solution Architecture

Date	15 April 2025
Team ID	SWTID1743695015
Project Name	Shopez: E-Commerce Application
Maximum Marks	4 Marks

Solution Architecture:

This diagram represents the architecture of a scalable and modular **e-commerce platform**, detailing the interaction between various frontend clients, backend microservices, databases, and third-party services.

1. Front-End Clients

- **Web Browser** interacts with the **Web Application** built using React or Angular.
- **Mobile App** interacts with the **Mobile Application** developed for iOS and Android.

Both platforms connect to the backend through an **API Gateway**.

2. API Gateway

- **API Gateway (Kong / AWS API Gateway)** is responsible for routing requests from clients to the appropriate backend services. It also handles concerns like rate limiting, authentication, and monitoring.
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3. Core Backend Services

- **Authentication Service (OAuth / JWT)**
Manages user authentication and authorization. Issues secure tokens for session management.
- **Cart Service (Shopping Cart)**
Manages users' shopping carts. Connects with the **Cart DB (Redis)** for fast, in-memory access to cart data.
- **Product Service (Catalog Management)**
Handles product information and images. Interacts with:
 - **Product DB (MongoDB)** to store product data
 - **S3 Bucket** for product image storage
- **Search Service (Elasticsearch)**
Enables product search functionality. Syncs with:
 - **Search Index (Elasticsearch)**

- Pulls data from **Product Service**
- **Order Service (Order Processing)**
Processes customer orders. Communicates with:
 - **Order DB (PostgreSQL)**
 - **Notification Service** for sending order confirmations
- **Payment Service (Payment Handling)**
Manages payments and connects to external:
 - **Payment Gateway (Stripe / PayPal)**
- **User Service (Profile Management)**
Manages user profiles and account information. Uses:
 - **User DB (PostgreSQL)**
- **Shipping Service (FedEx / UPS)**
Handles shipping integration and tracks delivery of orders.
- **Notification Service (Email / SMS)**
Sends messages and alerts to users for order status, payment confirmations, etc.

4. Supporting Components

- **Monitoring (CloudWatch / Prometheus)**
Collects logs, metrics, and alerts for system performance and reliability.
- **Analytics (Google Analytics)**
Tracks user behavior and provides insights on site/app usage.
- **CDN (CloudFront)**
Distributes static content (like images, scripts, and stylesheets) to enhance front-end performance.

Solution Architecture Diagram:

